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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/321,715	05/28/1999	YASUHIKO TAKEMURA	0756-1974	6930

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EXAMINER
WILCZEWSKI, MARY A

ART UNIT	PAPER NUMBER
2822	

DATE MAILED: 10/21/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

.Office Action Summary	Application No. 09/321,715	Applicant(s) Takemura et al.
	Examiner Mary Wilczewski	Art Unit 2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *three* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *Jul 22, 2002*.

2a) ☐ This action is **FINAL.** 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1, 3-9, 11-17, 19-25, 27-33, 35-41, and 43-105* is/are pending in the application.

4a) Of the above, claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1, 3-9, 11-17, 19-25, 27-33, 35-41, and 43-105* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☒ The proposed drawing correction filed on *Apr 10, 2000* is: a) ☒ approved b) ☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☒ All b) ☐ Some* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. *08/287,259*.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
4) ☐ Interview Summary (PTO-413) Paper No(s). _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 29, 2002, has been entered.

Priority

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. 08/287,259, filed on August 8, 1994.

Drawings

The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on April 10, 2000, have been approved.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-12, 14-16, 49-58, 60-62, 70-81, 83-85, and 94 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Chen et al., U.S. Patent 5,322,807, newly cited, in view of Ipri, U. S. Patent 4,597,160, of record.

Chen et al. disclose a method of fabricating a thin film transistor which comprises the steps of forming an amorphous silicon film, crystallizing the amorphous silicon film, and oxidizing the crystallized silicon film at a pressure of 5 to 10 atmospheres at a temperature less than 825 °C, see column 2, lines 54-56, column 3, lines 27-32, 42-47, and column 4, lines 13-16. Although Chen et al. disclose that growth of the TFT dielectric must be grown at a temperature less than 825 °C, Chen does not specifically teach to use temperatures in a range of 500 to 650 °C, or temperatures below the strain point of the glass substrate. Nor does Chen et al. disclose that the high pressure oxidation step is performed in an oxidizing atmosphere containing water vapor. Ipri discloses a method of fabricating a semiconductor display device which comprises the steps of: forming an amorphous silicon film having a thickness of 1000-5000 angstroms, crystallizing the amorphous silicon film and oxidizing the crystallized silicon film at a pressure of 1 atm and a

temperature in the range of 580 °C to 620 °C, see column 2, lines 3-34, the Example, and column 3, lines 20-28. Given the teaching of Chen et al. that it is necessary to use processing temperatures less than 825 °C in the fabrication of thin film transistors, it would have been obvious to one skilled in the art that the oxidation temperatures of Ipri could have been used in the known method of Chen et al., since these temperatures are below 825 °C. Moreover, it would have been obvious to one skilled in the art that the oxidizing atmosphere of Ipri, as well as the temperature range of Ipri, could have been used in the method of Chen et al., since Ipri teaches that a high quality dielectric of a TFT can be formed by the high pressure oxidation performed in steam at temperatures in the range of 580 to 620 °C.

Claims 17-24, 63-69, 86-93 and 95 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al., U.S. Patent 5,322,807, newly cited, in view of Ipri, U. S. Patent 4,597,160, further in view of Troxell et al., U. S. Patent 4,851,363, both of record.

Chen et al. and Ipri are applied as above. Chen and Ipri lack anticipation only of teaching to use an alkali-free glass substrate in the disclosed method of fabricating a thin film transistor. Troxell et al. disclose a method of fabricating polysilicon thin film transistors on inexpensive alkali-free glass substrates which require processing temperatures of less than about 800 °C. It would have been obvious to one skilled in the art that the alkali-free glass substrate of Troxell et al. could be used in the known method of Chen in view of Ipri, since the processing temperatures of Chen and Ipri are less than about 800 °C.

Claims 13, 59, 82, 98, 102, and 104 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al., U.S. Patent 5,322,807, newly cited, in view of Ipri, U. S. Patent 4,597,160, as applied to claims 1, 9, 49, 56, 70, and 78 above, and further in view of Wolf et al., pages 216-217, of record.

Chen and Ipri are applied as above. Ipri lacks anticipation only of disclosing that the steam oxidation step is a pyrogenic oxidation step. Wolf et al. disclose that high pressure steam oxidations can be performed in pyrogenic oxidation systems, see page 217. Hence, it would have been obvious to one skilled in the art that the high pressure steam oxidation step of Ipri could have been performed in a pyrogenic oxidation system, since pyrogenic oxidation systems are able to produce water at high pressures. Performance of the oxidation step of Ipri in a pyrogenic oxidation system would make the oxidation step of Ipri a pyrogenic oxidation step.

Claims 99, 103, and 105 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al., U.S. Patent 5,322,807, newly cited, in view of Ipri, U. S. Patent 4,597,160, in view of Troxell et al., as applied to claims 17, 63, and 86 above, and further in view of Wolf et al., pages 216-217, of record.

Chen, Ipri and Troxell are applied as above. Ipri lacks anticipation only of disclosing that the steam oxidation step is a pyrogenic oxidation step. Wolf et al. disclose that high pressure steam oxidations can be performed in pyrogenic oxidation systems, see page 217. Hence, it would have been obvious to one skilled in the art that the high pressure steam oxidation step of

Ipri could have been performed in a pyrogenic oxidation system, since pyrogenic oxidation systems are able to produce water at high pressures. Performance of the oxidation step of Ipri in a pyrogenic oxidation system would make the oxidation step of Ipri a pyrogenic oxidation step.

Claims 25-36, 38-40, and 96 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al., U.S. Patent 5,322,807, newly cited, in view of Ipri, U. S. Patent 4,597,160, in view of Wolf et al., pages 171-175, both of record.

Chen et al. disclose a method of fabricating a thin film transistor which comprises the steps of forming an amorphous silicon film, crystallizing the amorphous silicon film, and oxidizing the crystallized silicon film at a pressure of 5 to 10 atmospheres at a temperature less than 825 °C, see column 2, lines 54-56, column 3, lines 27-32, 42-47, and column 4, lines 13-16. Although Chen et al. disclose that growth of the TFT dielectric must be grown at a temperature less than 825 °C, Chen does not specifically teach to use temperatures in a range of 500 to 650 °C, or temperatures below the strain point of the glass substrate. Nor does Chen et al. disclose that the high pressure oxidation step is performed in an oxidizing atmosphere containing water vapor. Ipri discloses a method of fabricating a semiconductor display device which comprises the steps of: forming an amorphous silicon film having a thickness of 1000-5000 angstroms, crystallizing the amorphous silicon film and oxidizing the crystallized silicon film at a pressure of 1 atm and a temperature in the range of 580 °C to 620 °C, see column 2, lines 3-34, the Example, and column 3, lines 20-28. Given the teaching of Chen et al. that it is necessary to use processing

temperatures less than 825 °C in the fabrication of thin film transistors, it would have been obvious to one skilled in the art that the oxidation temperatures of Ipri could have been used in the known method of Chen et al., since these temperatures are below 825 °C. Moreover, it would have been obvious to one skilled in the art that the oxidizing atmosphere of Ipri, as well as the temperature range of Ipri, could have been used in the method of Chen et al., since Ipri teaches that a high quality dielectric of a TFT can be formed by the high pressure oxidation performed in steam at temperatures in the range of 580 to 620 °C. In the method of Ipri, the oxidizing step forms gate insulating layer 23 and then gate electrodes 24 are formed on the gate insulating layer, see figures 1-4. Ipri then discloses that the remaining processing steps used in the fabrication of a TFT are conventional : deposition of silicon dioxide layer 22 by CVD adjacent the crystallized silicon film. Since this is a conventional processing step used in the fabrication of TFTs, it would have been obvious to one skilled in the art that the step of forming silicon dioxide layer 22 could have been performed in the known method of Chen et al. Ipri lacks anticipation only of depositing silicon dioxide layer 22 by plasma CVD. However, it is well known that plasma-enhanced CVD permits the deposition of silicon dioxide at low temperatures, which are necessary when using inexpensive glass substrates, has fast deposition rates and provides good step coverage, see Wolf et al., pages 171-175. Therefore it would have been obvious to one skilled in the art that the silicon dioxide layer 22 of Ipri could have been deposited by plasma CVD.

Claims 41-48 and 97 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al., U.S. Patent 5,322,807, newly cited, in view of Ipri, U. S. Patent 4,597,160, in view of Wolf et al., pages 171-175, further in view of Troxell et al., U. S. Patent 4,851,363, of record.

Chen et al. disclose a method of fabricating a thin film transistor which comprises the steps of forming an amorphous silicon film, crystallizing the amorphous silicon film, and oxidizing the crystallized silicon film at a pressure of 5 to 10 atmospheres at a temperature less than 825 °C, see column 2, lines 54-56, column 3, lines 27-32, 42-47, and column 4, lines 13-16. Although Chen et al. disclose that growth of the TFT dielectric must be grown at a temperature less than 825 °C, Chen does not specifically teach to use temperatures in a range of 500 to 650 °C, or temperatures below the strain point of the glass substrate. Nor does Chen et al. disclose that the high pressure oxidation step is performed in an oxidizing atmosphere containing water vapor. Ipri discloses a method of fabricating a semiconductor display device which comprises the steps of: forming an amorphous silicon film having a thickness of 1000-5000 angstroms, crystallizing the amorphous silicon film and oxidizing the crystallized silicon film at a pressure of 1 atm and a temperature in the range of 580 °C to 620 °C, see column 2, lines 3-34, the Example, and column 3, lines 20-28. Given the teaching of Chen et al. that it is necessary to use processing temperatures less than 825 °C in the fabrication of thin film transistors, it would have been obvious to one skilled in the art that the oxidation temperatures of Ipri could have been used in the known method of Chen et al., since these temperatures are below 825 °C. Moreover, it would

have been obvious to one skilled in the art that the oxidizing atmosphere of Ipri, as well as the temperature range of Ipri, could have been used in the method of Chen et al., since Ipri teaches that a high quality dielectric of a TFT can be formed by the high pressure oxidation performed in steam at temperatures in the range of 580 to 620 °C. In the method of Ipri, the oxidizing step forms gate insulating layer 23 and then gate electrodes 24 are formed on the gate insulating layer, see figures 1-4. Ipri then discloses that the remaining processing steps used in the fabrication of a TFT are conventional : deposition of silicon dioxide layer 22 by CVD adjacent the crystallized silicon film. Since this is a conventional processing step used in the fabrication of TFTs, it would have been obvious to one skilled in the art that the step of forming silicon dioxide layer 22 could have been performed in the known method of Chen et al. Ipri lacks anticipation only of depositing silicon dioxide layer 22 by plasma CVD. However, it is well known that plasma-enhanced CVD permits the deposition of silicon dioxide at low temperatures, which are necessary when using inexpensive glass substrates, has fast deposition rates and provides good step coverage, see Wolf et al., pages 171-175. Therefore it would have been obvious to one skilled in the art that the silicon dioxide layer 22 of Ipri could have been deposited by plasma CVD.

Chen and Ipri also lack anticipation of teaching to use an alkali-free glass substrate in the disclosed method of fabricating a thin film transistor. Troxell et al. disclose a method of fabricating polysilicon thin film transistors on inexpensive alkali-free glass substrates which require processing temperatures of less than about 800 °C. It would have been obvious to one skilled in the art that the alkali-free glass substrate of Troxell et al. could be used in the known

method of Chen in view of Ipri, since the processing temperatures of both Chen and Ipri are less than about 800 °C.

Claims 100 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al., U.S. Patent 5,322,807, newly cited, in view of Ipri, U. S. Patent 4,597,160, in view of Wolf et al., pages 171-175, as applied to claims 25 and 33, respectively, above, and further in view of Wolf et al., pages 216-217, of record.

Chen, Ipri and Wolf et al. are applied as above. Ipri lacks anticipation only of disclosing that the steam oxidation step is a pyrogenic oxidation step. Wolf et al. disclose that high pressure steam oxidations can be performed in pyrogenic oxidation systems, see page 217. Hence, it would have been obvious to one skilled in the art that the high pressure steam oxidation step of Ipri could have been performed in a pyrogenic oxidation system, since pyrogenic oxidation systems are able to produce water at high pressures. Performance of the oxidation step of Ipri in a pyrogenic oxidation system would make the oxidation step of Ipri a pyrogenic oxidation step.

Claim 101 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al., U.S. Patent 5,322,807, newly cited, in view of Ipri, U. S. Patent 4,597,160, in view of Wolf et al., Pages 171-175, further in view of Troxell et al., as applied to claim 41 above, and further in view of Wolf et al., pages 216-217, of record.

Chen, Ipri, Wolf et al., and Troxell are applied as above. Ipri lacks anticipation only of disclosing that the steam oxidation step is a pyrogenic oxidation step. Wolf et al. disclose that high pressure steam oxidations can be performed in pyrogenic oxidation systems, see page 217. Hence, it would have been obvious to one skilled in the art that the high pressure steam oxidation step of Ipri could have been performed in a pyrogenic oxidation system, since pyrogenic oxidation systems are able to produce water at high pressures. Performance of the oxidation step of Ipri in a pyrogenic oxidation system would make the oxidation step of Ipri a pyrogenic oxidation step.

Double Patenting

Claims 1-105 of this application conflict with claims 1, 2, 12, 13, 17, and 18 of Application No. 09/222,185. 37 CFR 1.78(b) provides that when two or more applications filed by the same applicant contain conflicting claims, elimination of such claims from all but one application may be required in the absence of good and sufficient reason for their retention during pendency in more than one application. Applicant is required to either cancel the conflicting claims from all but one application or maintain a clear line of demarcation between the applications. See MPEP § 822.

Claims 1-105 of this application conflict with claims 1 and 6 of Application No. 09/615,078. 37 CFR 1.78(b) provides that when two or more applications filed by the same applicant contain conflicting claims, elimination of such claims from all but one application may be required in the absence of good and sufficient reason for their retention during pendency in more

than one application. Applicant is required to either cancel the conflicting claims from all but one application or maintain a clear line of demarcation between the applications. See MPEP § 822.

Claims 1-105 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-26 of copending Application No. 09/222,185 in view of Fonash, U. S. Patent 5,275,851, of record. The claims of the present application are generic to those presented in application Serial No. 09/222, 185 in that both sets of claims require the oxidation of a crystallized semiconductor film at high pressures. The claims of application Serial No. 09/222,185 further require the use of a crystallization-promoting catalyst. However, it is well known to use a crystallization-promoting catalyst in the crystallization of amorphous silicon films, as evidenced by Fonash et al.

This is a provisional obviousness-type double patenting rejection.

Claims 1-105 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-44 of copending Application No. 09/615,078 in view of Fonash et al., U. S. Patent 5,275,851, of record. The claims of the present application are generic to those presented in application Serial No. 09/615,078 in that both sets of claims require the oxidation of a crystallized semiconductor film at high pressures. The claims of application Serial No. 09/615,078 further require the use of a crystallization-promoting catalyst. However, it is well known to use a crystallization-promoting catalyst in the crystallization of amorphous silicon films, as evidenced by Fonash et al.

This is a provisional obviousness-type double patenting rejection.

Response to Arguments

Applicant's arguments with respect to claims 1, 3-9, 11-17, 19-25, 27-33, 35-41, and 43-105 have been considered but are moot in view of the new ground(s) of rejection.

Concerning the double patenting rejections, Applicants have argued that motivation for combining the teachings of Fonash et al '851 with those of claims 1-26 of the '185 application or claims 1-44 of the '078 application have not been provided by the Examiner. Ample motivation for combining these teachings is found in Fonash '851 at column 2, lines 59-66, that is, a substantial decrease in crystallization times. Decreasing the crystallization time will result in a decrease in processing costs. Hence, there is sufficient motivation found in the prior art for using a crystallization-promoting catalyst..

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Wilczewski whose telephone number is (703) 308-2771.

M. Wilczewski
Primary Examiner
Tech Center 2800

MW
October 17, 2002